AMENDMENTS TO THE CLAIMS

The listing of the claims will replace the previous version, and the listing of the claims:

LISTING OF THE CLAIMS

1-28. (cancelled)

29. (currently amended) An electro-static chucking mechanism for chucking an object electro-statically, comprising:

a stage including a dielectric block having a chucking surface with a concave portion to be closed by the object for chucking thereon;

gas introducing channels communicating with the concave portion;

a chucking electrode provided in the dielectric block;

a main body fixed to the dielectric block and having a cavity;

a temperature controller attached to the main body to circulate a coolant to the cavity for controlling temperature of the object;

a chucking power supply connected to the chucking electrode to apply voltage thereto to chuck the object; and

a gas introduction system connected to the gas introducing channels for introducing heat-exchange gas into the concave to control temperature of the object while increasing pressure in the concave;

wherein said chucking surface includes a marginal convex on which a periphery of the object to be chucked is contacted to confine the heat-exchange gas within the concave portion, and the concave portion includes heat-exchange concaves for promoting heat-exchange under increased pressure having a depth in a range of 1 to 20 μm, and gas-diffusion concaves deeper than the heat-exchange concave for diffusing the heat-exchange gas to the heat-exchange

concaves, said gas-diffusion concaves including circumferential concaves arranged coaxially to the stage and having an outermost concave located inside the marginal convex and a plurality of inner concaves inside the outermost concave, and radial concaves extending from a center of the stage to the outermost concave while crossing the inner concaves.

30. (previously presented) An electro-static chucking mechanism as claimed in claim 29, further comprising lift pins for receiving and transferring the object, each lift pin being disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.

31. (previously presented) An electro-static chucking mechanism as claimed in claim 29, wherein the gas introducing channels communicate with the gas diffusion concaves at crossing portions of the radial concaves and the circumferential concave.

32. (previously presented) An electro-static chucking mechanism as claimed in claim 31, wherein each lift pin is disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.

33. (currently amended) An electro-static chucking mechanism for chucking an object electro-statically, comprising:

a stage including a dielectric block having a chucking surface with a concave portion to be closed by the object for chucking thereon;

gas introducing channels communicating with the concave portion;

a chucking electrode provided in the dielectric block;

a main body fixed to the dielectric block and having a cavity;

a temperature controller attached to the main body to circulate a coolant to the cavity for controlling temperature of the object;

a chucking power supply connected to the chucking electrode to apply voltage thereto to chuck the object; and

a gas introduction system connected to the gas introducing channels for introducing heat-exchange gas into the concave portion to control temperature of the object while increasing pressure in the concave;

wherein said chucking surface includes a marginal convex on which a periphery of the object to be chucked is contacted to confine the heat-exchange gas within the concave portion, and the concave portion includes heat-exchange concaves for promoting heat-exchange under increased pressure having a depth in a range of 1 to 20 μm, and gas-diffusion concaves deeper than the heat-exchange concaves for diffusing the heat-exchange gas to the heat-exchange concaves; said gas-diffusion concaves includes circumferential concaves arranged coaxially to the stage, and radial concaves extending from a center of the stage, said circumferential concaves having an outermost concave located inside the marginal convex, and a plurality of inner concaves inside the outermost concaves, said radial concaves crossing the inner concaves and reaching the outermost concave; and all of the gas introducing channels communicate with the gas-diffusion concaves at positions off the center of the stage.

34. (previously presented) An electro-static chucking mechanism as claimed in claim 33, wherein the gas introducing channels communicate with the gas diffusion concaves at crossing portions of the radial concaves and the circumferential concave.

35. (previously presented) An electro-static chucking mechanism as claimed in claim 34, further comprising lift pins for receiving and transferring the object, each lift pin being disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.

36. (cancelled)

37. (currently amended) An electro-static chucking mechanism as claimed in claim ~~36~~ 29, wherein said chucking surface has a contact area to contact with the object in a range of 3 to 20 % relative to a surface area of the object facing the stage.

38. (previously presented) An electro-static chucking mechanism as claimed in claim 37, wherein said gas-diffusion concave has an area on the chucking surface in a range of 5 to 30 % relative to a surface area of the object facing the stage.

39. (previously presented) An electro-static chucking mechanism as claimed in claim 38, wherein said gas-diffusion concave has a depth in the range of 50 to 1,000 μm.

40. (cancelled)

41. (currently amended) An electro-static chucking mechanism as claimed in claim ~~40~~ 33, wherein said chucking surface has a contact area to contact with the object in a range of 3 to 20 % relative to a surface area of the object facing the stage.

42. (previously presented) An electro-static chucking mechanism as claimed in claim 41, wherein said gas-diffusion concave has an area on the chucking surface in a range of 5 to 30 % relative to a surface area of the object facing the stage.

43. (previously presented) An electro-static chucking mechanism as claimed in claim 42, wherein said gas-diffusion concave has a depth in the range of 50 to 1,000 μm.

44. (previously presented) A surface processing apparatus, comprising:

a process chamber for receiving an object to be processed therein; and

the electro-static chucking mechanism according to claim 29, said electro-static chucking mechanism facing an inner surface of the process chamber for chucking said object electro-statically thereon in the process chamber

45. (previously presented) A surface processing apparatus as claimed in claim 44, wherein said chucking mechanism further comprises lift pins for receiving and transferring the object, each lift pin being disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.

46. (previously presented) A surface processing apparatus as claimed in claim 44, wherein the gas introducing channels communicate with the gas diffusion concaves at crossing portions of the radial concaves and the circumferential concaves.

47. (previously presented) A surface processing apparatus as claimed in claim 46, wherein each lift pin is disposed in each gas

introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.

48. (previously presented) A surface processing apparatus, comprising:

a process chamber for receiving an object to be processed therein; and

the electro-static chucking mechanism according to claim 33, said electro-static chucking mechanism facing an inner surface of the process chamber for chucking said object electro-statically thereon in the process chamber.

49. (previously presented) A surface processing apparatus as claimed in claim 48, wherein the gas introducing channels communicate with the gas diffusion concaves at crossing portions of the radial concaves and the circumferential concaves.

50. (previously presented) A surface processing apparatus as claimed in claim 49, wherein said chucking mechanism further comprises lift pins for receiving and transferring the object, each lift pin being disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.

51. (cancelled)

52. (currently amended) A surface processing apparatus as claimed in claim ~~51~~ 29, wherein said chucking surface has a contact area to contact with the object in a range of 3 to 20 % relative to a surface area of the object facing the stage.

53. (previously presented) A surface processing apparatus as claimed in claim 52, wherein said gas-diffusion concave has a cross-sectional area along the chucking surface in a range of 5 to 30 % relative to a surface area of the object facing the stage.

54. (previously presented) A surface processing apparatus as claimed in claim 53, wherein said gas-diffusion concave has a depth in a range of 50 to 1,000 μm.

55. (cancelled)

56. (currently amended) A surface processing apparatus as claimed in claim ~~55~~ 48, wherein said chucking surface has a contact area to contact with the object in a range of 3 to 20 % relative to a surface area of the object facing the stage.

57. (previously presented) A surface processing apparatus as claimed in claim 56, wherein said gas-diffusion concave has a cross-sectional area along the chucking surface in a range of 5 to 30 % relative to a surface area of the object facing the stage.

58. (previously presented) A surface processing apparatus as claimed in claim 57, wherein said gas-diffusion concave has a depth in a range of 50 to 1,000 μm.